FIG. 1

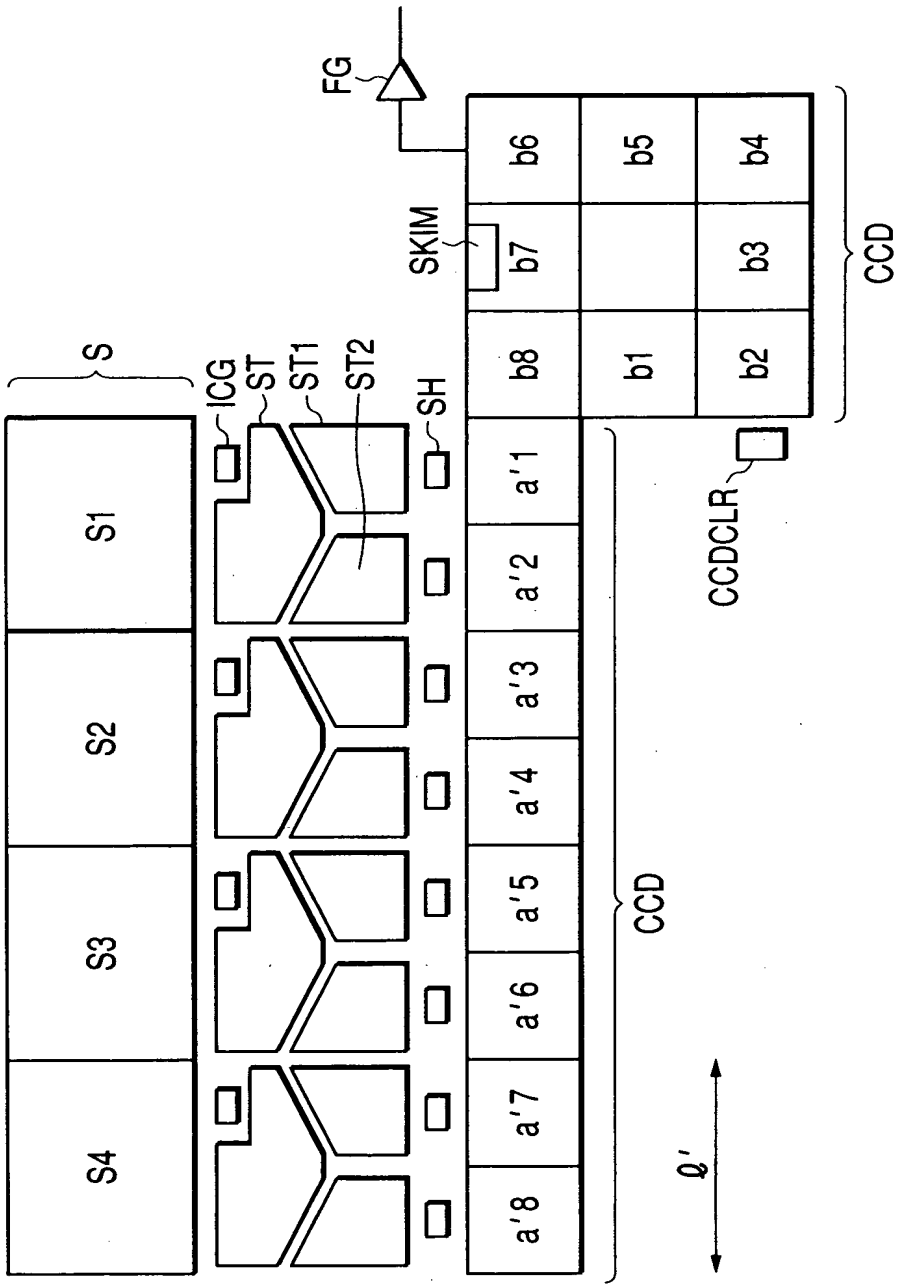

FG
SKIM
S
ICG
ST
ST1
ST2
SH
S1
S2
S3
S4
b6
b5
b4
b7
b3
b8
b1
b2
a'1
a'2
a'3
a'4
a'5
a'6
a'7
a'8
CCD
CCD
CCDCLR
l'

FIG. 2

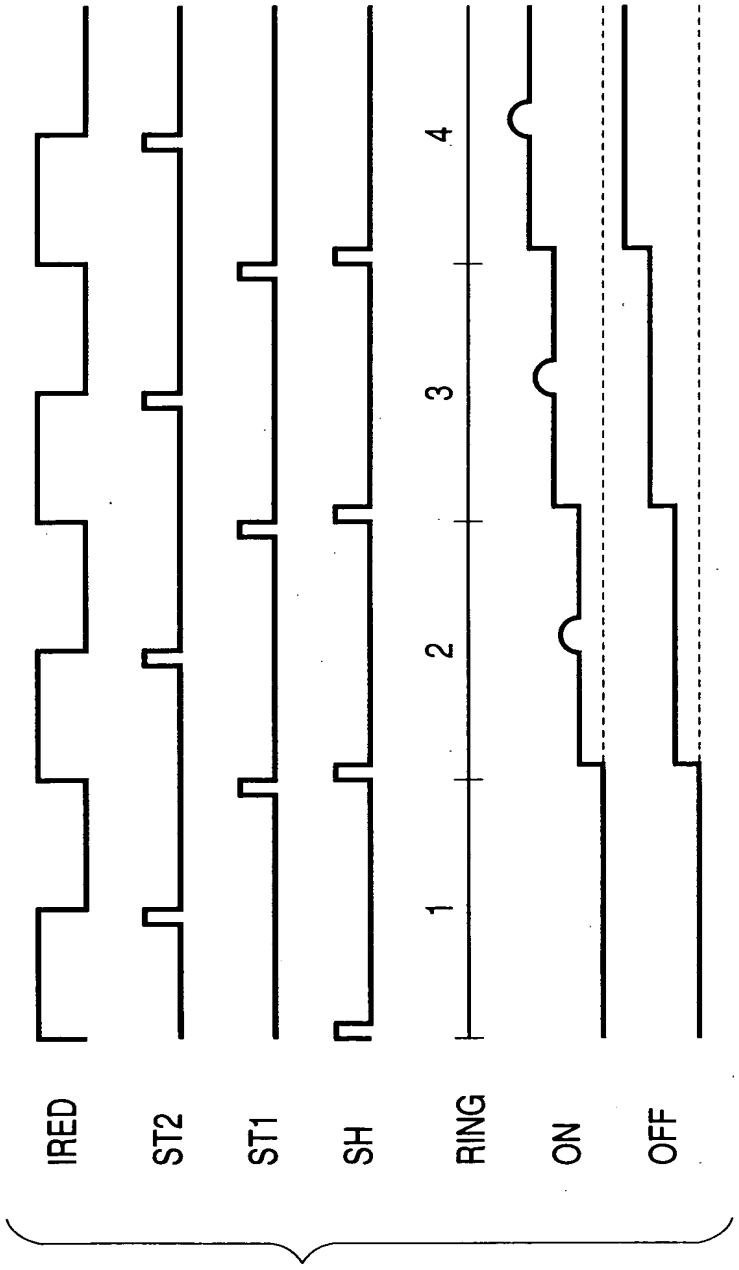


FIG. 3A

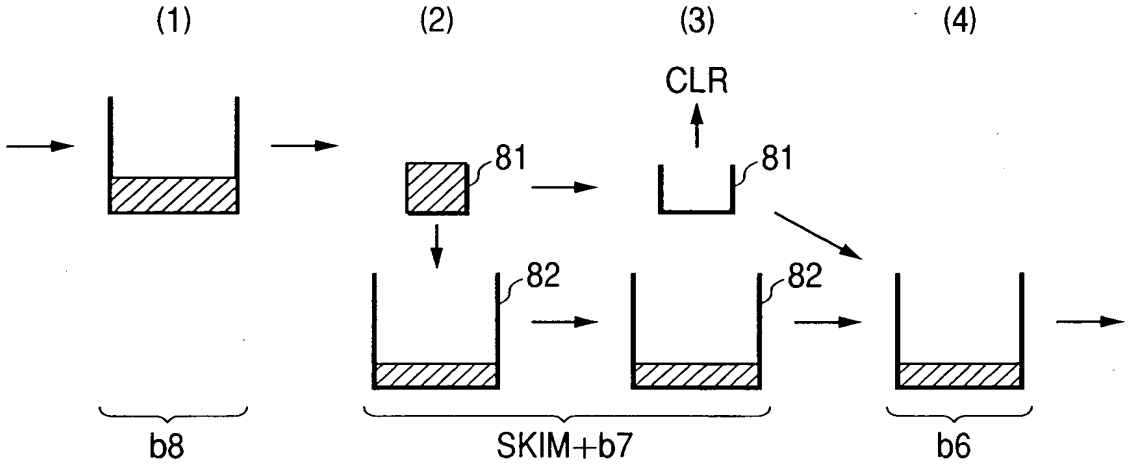

(1)
(2)
(3)
(4)
CLR
81
81
82
82
b8
SKIM+b7
b6

FIG. 3B

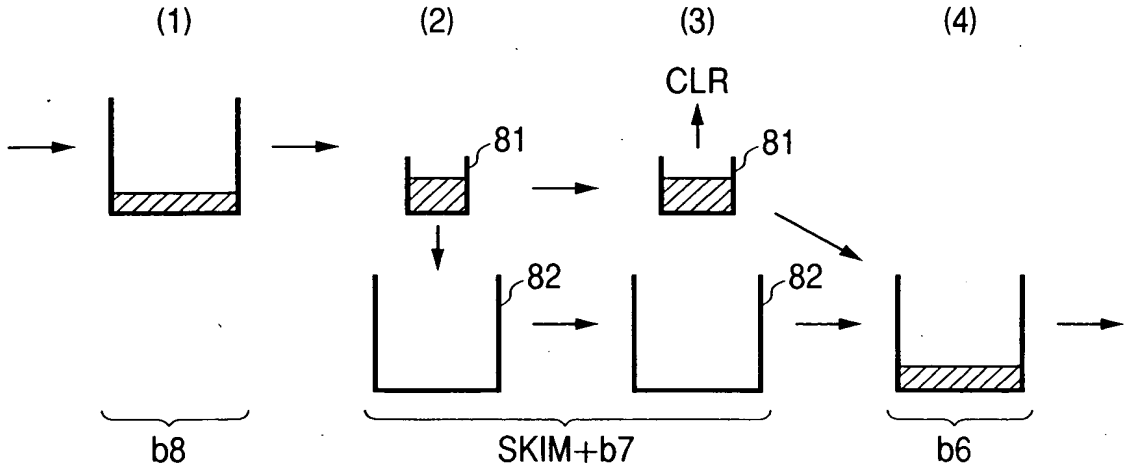

(1)
(2)
(3)
(4)
CLR
81
81
82
82
b8
SKIM+b7
b6

FIG. 4

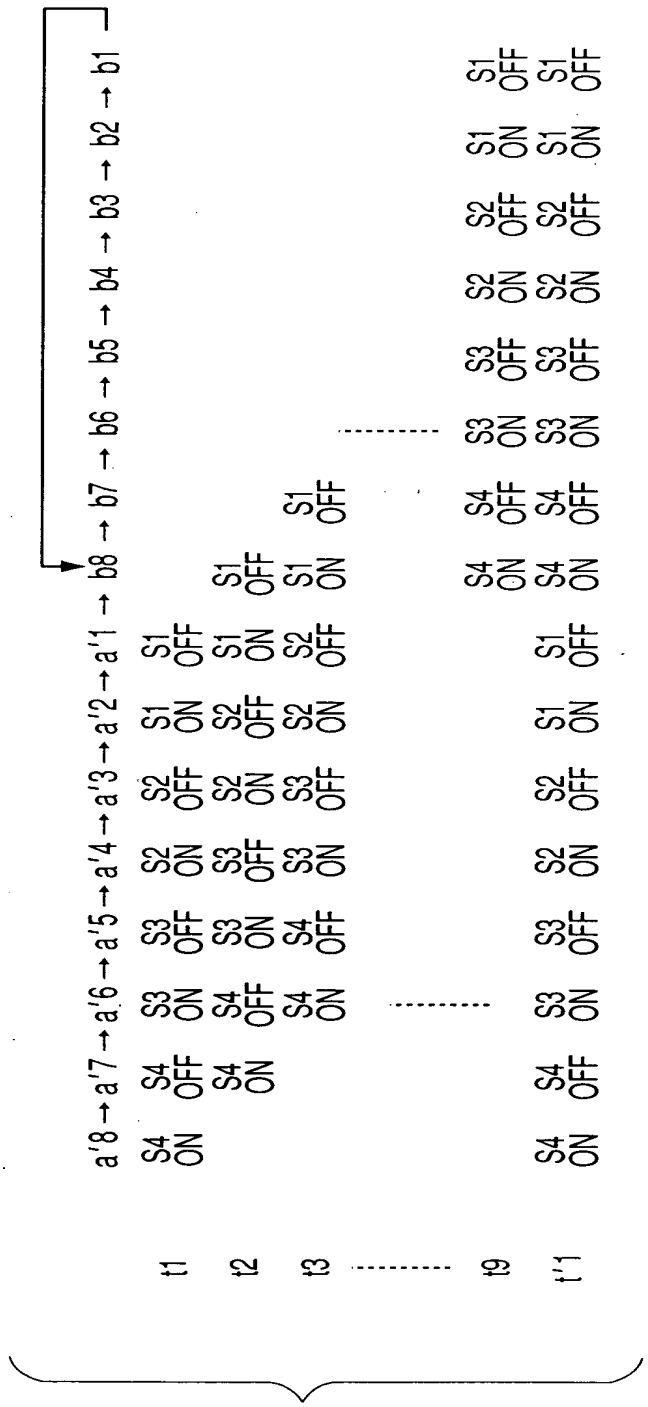


FIG. 5

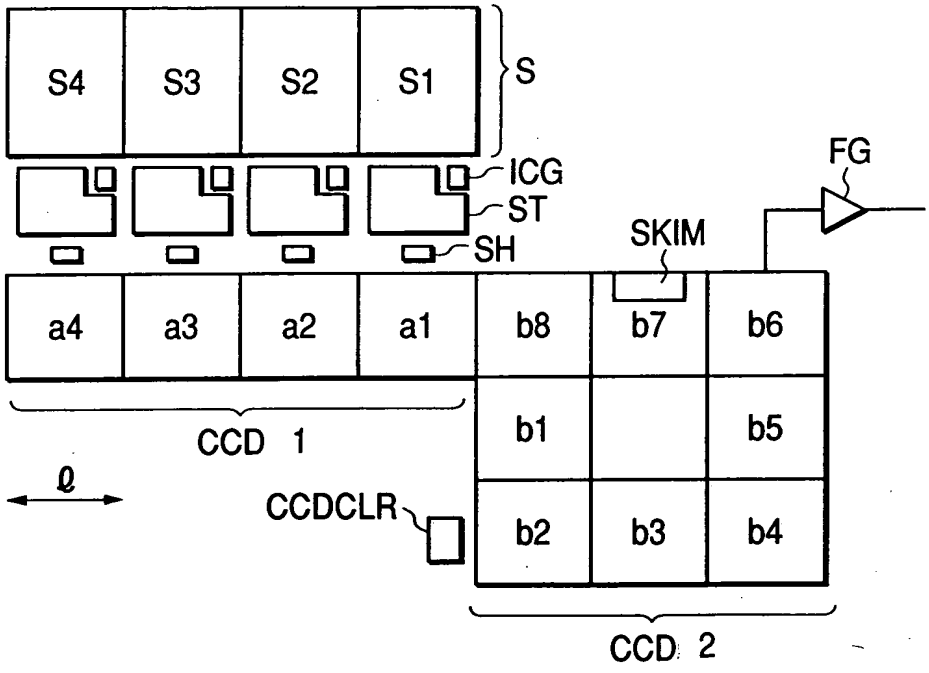

S4
S3
S2
S1
S
ICG
ST
SH
FG
SKIM
a4
a3
a2
a1
b8
b7
b6
b1
b5
b2
b3
b4
CCD 1
CCD 2
CCDCLR
ℓ

FIG. 6

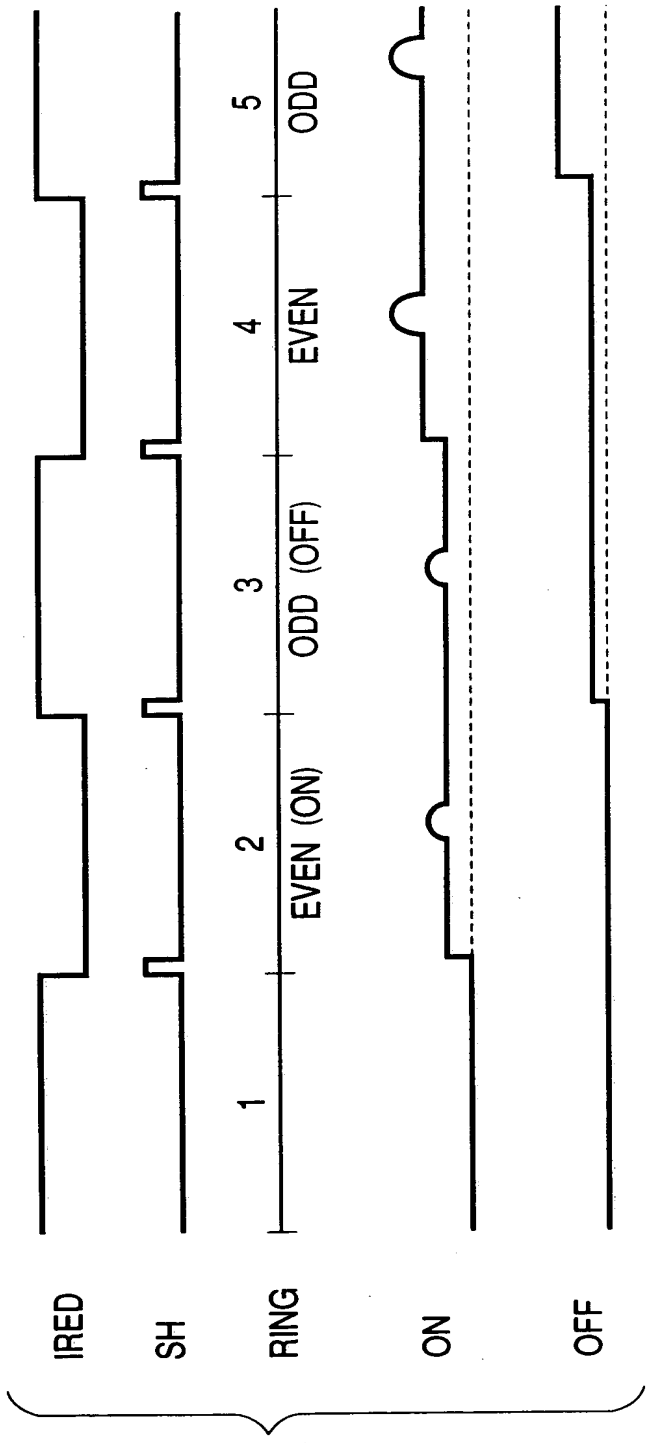


FIG. 7

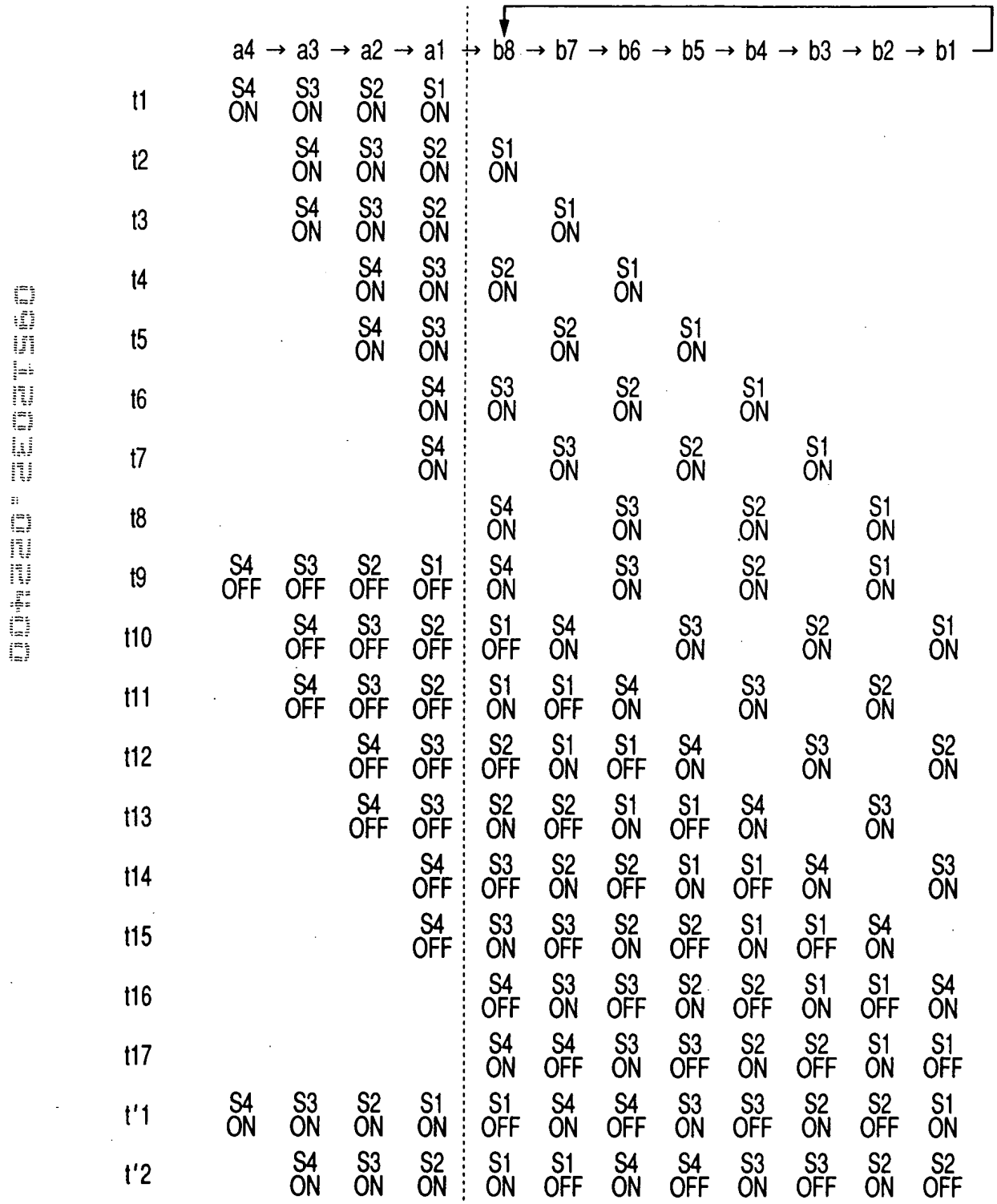

a4 → a3 → a2 → a1 → b8 → b7 → b6 → b5 → b4 → b3 → b2 → b1
t1 S4 ON S3 ON S2 ON S1 ON
t2 S4 ON S3 ON S2 ON S1 ON
t3 S4 ON S3 ON S2 ON S1 ON
t4 S4 ON S3 ON S2 ON S1 ON
t5 S4 ON S3 ON S2 ON S1 ON
t6 S4 ON S3 ON S2 ON S1 ON
t7 S4 ON S3 ON S2 ON S1 ON
t8 S4 ON S3 ON S2 ON S1 ON
t9 S4 OFF S3 OFF S2 OFF S1 OFF S4 ON S3 ON S2 ON S1 ON
t10 S4 OFF S3 OFF S2 OFF S1 OFF S4 ON S3 ON S2 ON S1 ON
t11 S4 OFF S3 OFF S2 OFF S1 ON S1 OFF S4 ON S3 ON S2 ON
t12 S4 OFF S3 OFF S2 OFF S1 ON S1 OFF S4 ON S3 ON S2 ON
t13 S4 OFF S3 OFF S2 ON S2 OFF S1 ON S1 OFF S4 ON S3 ON
t14 S4 OFF S3 OFF S2 ON S2 OFF S1 ON S1 OFF S4 ON S3 ON
t15 S4 OFF S3 ON S3 OFF S2 ON S2 OFF S1 ON S1 OFF S4 ON
t16 S4 OFF S3 ON S3 OFF S2 ON S2 OFF S1 ON S1 OFF S4 ON
t17 S4 ON S4 OFF S3 ON S3 OFF S2 ON S2 OFF S1 ON S1 OFF
t'1 S4 ON S3 ON S2 ON S1 ON S1 OFF S4 ON S4 OFF S3 ON S3 OFF S2 ON S2 OFF S1 ON
t'2 S4 ON S3 ON S2 ON S1 ON S1 OFF S4 ON S4 OFF S3 ON S3 OFF S2 ON S2 OFF

FIG. 8

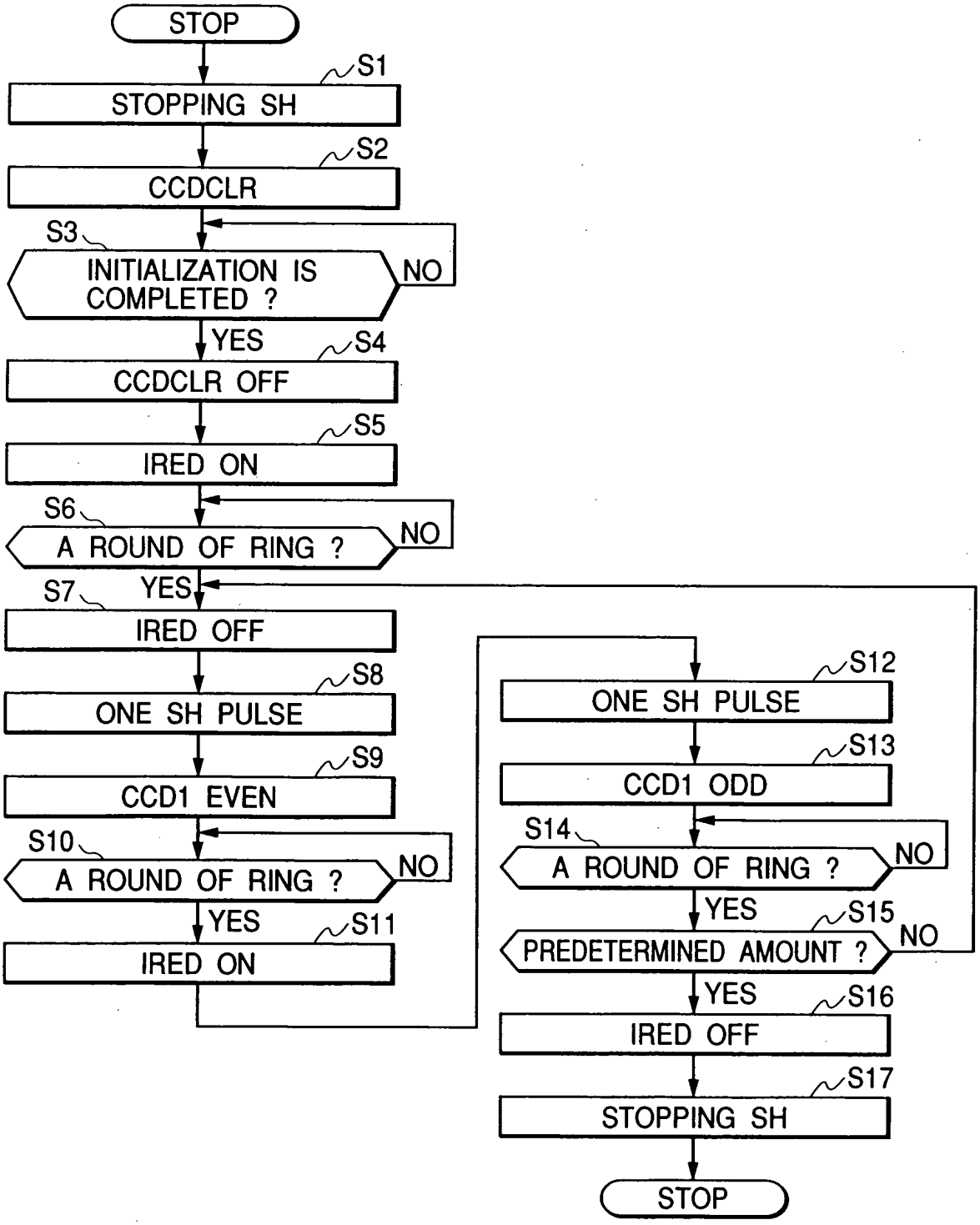

STOP
S1
STOPPING SH
S2
CCDCLR
S3
INITIALIZATION IS COMPLETED ?
NO
YES
S4
CCDCLR OFF
S5
IRED ON
S6
A ROUND OF RING ?
NO
YES
S7
IRED OFF
S8
ONE SH PULSE
S9
CCD1 EVEN
S10
A ROUND OF RING ?
NO
YES
S11
IRED ON
S12
ONE SH PULSE
S13
CCD1 ODD
S14
A ROUND OF RING ?
NO
YES
S15
PREDETERMINED AMOUNT ?
NO
YES
S16
IRED OFF
S17
STOPPING SH
STOP

FIG. 9

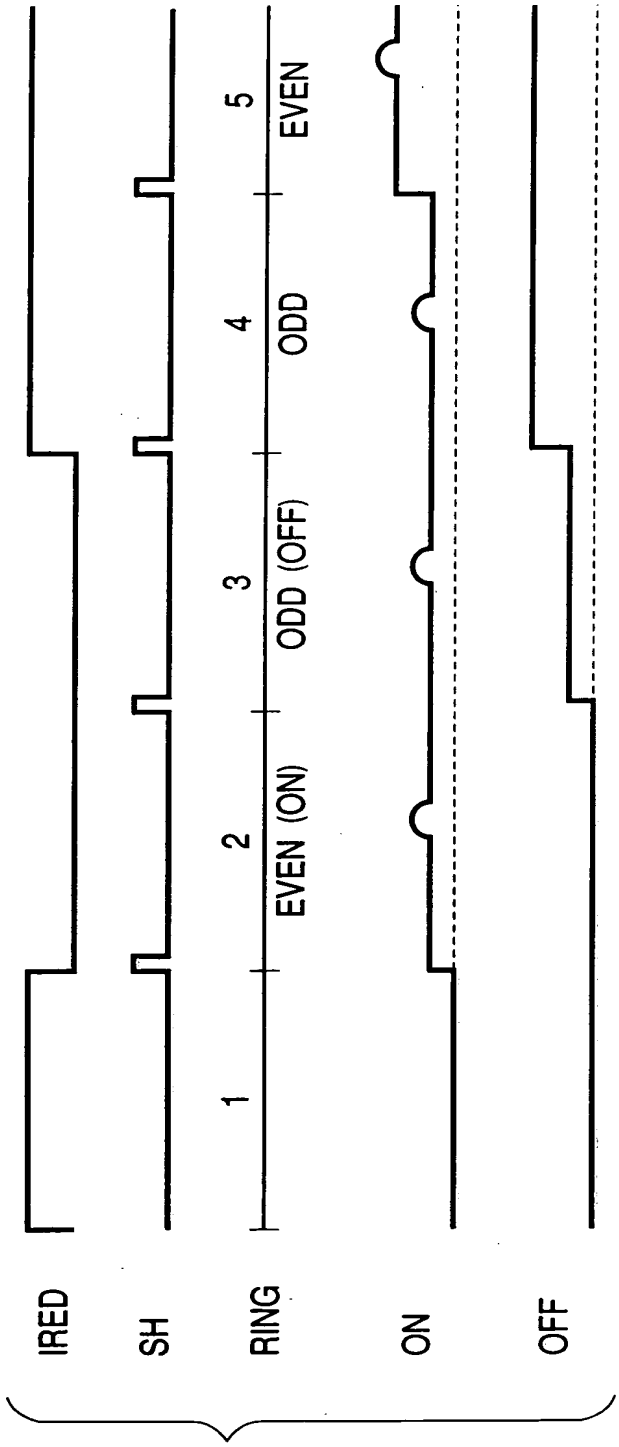
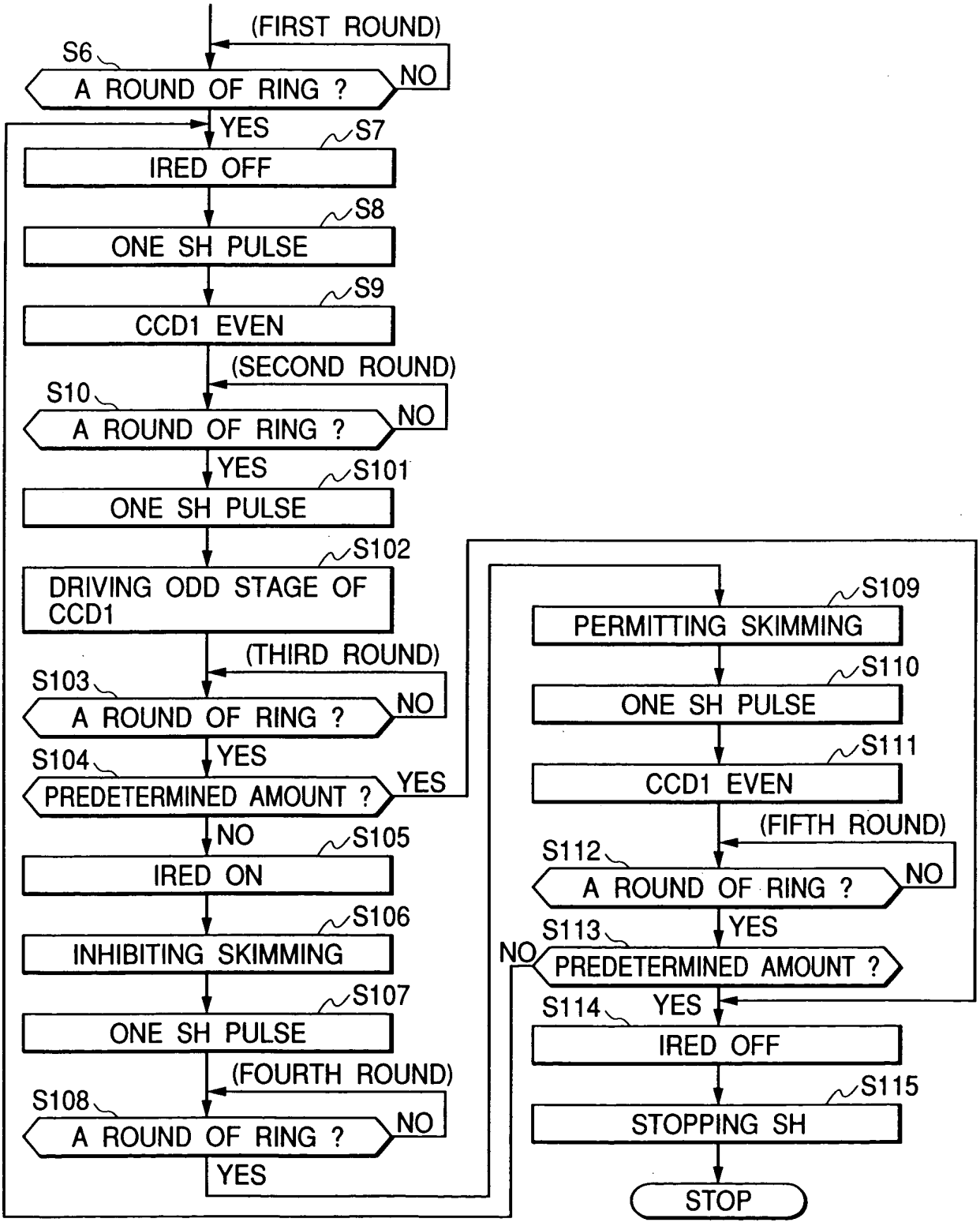


FIG. 10


(FIRST ROUND)
S6
A ROUND OF RING ?
NO
YES
S7
IRED OFF
S8
ONE SH PULSE
S9
CCD1 EVEN
(SECOND ROUND)
S10
A ROUND OF RING ?
NO
YES
S101
ONE SH PULSE
S102
DRIVING ODD STAGE OF CCD1
(THIRD ROUND)
S103
A ROUND OF RING ?
NO
YES
S104
PREDETERMINED AMOUNT ?
YES
NO
S105
IRED ON
S106
INHIBITING SKIMMING
S107
ONE SH PULSE
(FOURTH ROUND)
S108
A ROUND OF RING ?
NO
YES
S109
PERMITTING SKIMMING
S110
ONE SH PULSE
S111
CCD1 EVEN
(FIFTH ROUND)
S112
A ROUND OF RING ?
NO
YES
S113
NO
PREDETERMINED AMOUNT ?
S114
YES
IRED OFF
S115
STOPPING SH
STOP